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(54) Title: **ENTEROCOCCAL VIRULENCE FACTORS**

(57) Abstract: The invention generally provides a novel approach to identifying Enterococcal virulence factors and for identifying compounds for treating bacterial pathogenesis. The invention further provides novel Enterococcal virulence factors, which serve as targets for drug discovery.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/22979

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07K 1/00

US CL : 530/350

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 530/350

Documentation searched other than minimum documentation to the extent that such documents are included in the fields

searched: ISSUED PATENTS; SPTREMBL; SWISSPROT

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

STN: WPIDS; BIOSIS; MEDLINE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FERRETTI ET AL, "Complete Genome Sequence of an M1 Strain of Streptococcus Pyogenes", PNAS, Vol. 98, No. 8, page 4658-4663., April 10, 2001, see the entire document.	1, 4, 5, 8
X,P	GLASER ET AL, "Comparative Genomics of Listeria Species", Science, Vol. 294, issue 5543, pages 849-852, October 26, 2001, see the entire document.	1, 4, 5 and 8

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"G" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

24 JULY 2003

Date of mailing of the international search report

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Name and mailing address of the ISA/US  
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/22979

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1, 4, 5, 8 (SEQ ID NO: 3)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/22979

## BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

Group I, claim(s) 1, 4, 5, and 8 (SEQ ID NO:3) are drawn to and isolated polypeptide.  
 Group II, claim(s) 11, 14, 15, and 18 (SEQ ID NO:15) are drawn to an isolated polypeptide.  
 Group III, claim(s) 21, 24, 25 and 28 (SEQ ID NO:18) are drawn an isolated polypeptide.  
 Group IV, claim(s) 31, 34, 35 and 38 (SEQ ID NO:30) are drawn an isolated polypeptide.  
 Group V, claim(s) 41, 44, 45 and 48 (SEQ ID NO:6) are drawn an isolated polypeptide.  
 Group VI, claim(s) 51, 54, 55 and 58 (SEQ ID NO:9) are drawn an isolated polypeptide.  
 Group VII, claim(s) 61, 64, 65 and 68 (SEQ ID NO:12) are drawn an isolated polypeptide.  
 Group VIII, claim(s) 71, 74, 75 and 78 (SEQ ID NO:21) are drawn an isolated polypeptide.  
 Group IX, claim(s) 81, 84, 85 and 88 (SEQ ID NO:24) are drawn an isolated polypeptide.  
 Group X, claim(s) 91, 94, 95 and 98 (SEQ ID NO:27) are drawn an isolated polypeptide.  
 Group XI, claim(s) 2, 3, 6 and 7 (SEQ ID NO:2) are drawn an isolated nucleic acid.  
 Group XII, claim(s) 12, 13, 16 and 17 (SEQ ID NO:14) are drawn an isolated nucleic acid.  
 Group XIII, claim(s) 22, 23, 26 and 27 (SEQ ID NO:17) are drawn an isolated nucleic acid.  
 Group XIV, claim(s) 32, 33, 36 and 37 (SEQ ID NO:29) are drawn an isolated nucleic acid.  
 Group XV, claim(s) 42, 43, 46 and 47 (SEQ ID NO:5) are drawn an isolated nucleic acid.  
 Group XVI, claim(s) 52, 53, 56 and 57 (SEQ ID NO:8) are drawn an isolated nucleic acid.  
 Group XVII, claim(s) 62, 63, 66 and 67 (SEQ ID NO:11) are drawn an isolated nucleic acid.  
 Group XVIII, claim(s) 72, 73, 76 and 77 (SEQ ID NO:20) are drawn an isolated nucleic acid.  
 Group XIX, claim(s) 82, 83, 86 and 87 (SEQ ID NO:23) are drawn an isolated nucleic acid.  
 Group XX, claim(s) 92, 93, 96 and 97 (SEQ ID NO:26) are drawn an isolated nucleic acid.  
 Group XXI, claim(s) 9, 10, 19, 20, 29, 30, 39, 40, 49, 50, 59, 60, 69, 70, 79, 80, 89, 90, 99 and 100 are drawn a vaccine.

The inventions listed as Groups I-XXI do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The products of the invention (polypeptide, nucleic acid and vaccine) are separate and distinct because they have different structures, function and modes of operation. For example the DNA can be used in a hybridization assay and the protein can be used to make antibodies. In addition, the product of Group I does not escape the prior art as the claimed protein is taught by Ferretti et al. (PNAS, vol. 98, no. 8, pages 4658-4663, June 1, 2001). Thus, the claimed invention is not so linked by a special technical feature, thus, unity of invention is lacking.

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